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Forest Health Protection
4746 South 1900 East
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Subject: Spruce beetle - Silviculture

To: Billy Dye, Forester
Ferron Ranger District

Historically we have relied on the post mortem approach to address spruce beetle effects, too often waiting until the infestation has killed hundreds of trees before initiating any action. If we want to address spruce beetle populations, then a concerted effort should be made to reduce the potential for beetle development and spread.

Few spruce stands receive pre-outbreak actions designed to reduce or eliminate tree mortality. It's important to compare effects that have occurred within the spruce beetle infested area on the Forest to uninfested sites. For example, what are the net effects associated with saved recreation values, watershed protection, visuals, fire hazard, and changes in wildlife habitat for sites where a residual stand of older spruce is maintained and not lost as a result of a spruce beetle outbreak.

The first step is to determine the management objectives for each spruce-fir landscape. In accordance with these objectives, designate spruce-fir sites either as a beetle management or no management area. In sites designated as a spruce beetle management area, environmentally sensitive and economically sound silvicultural treatments and/or suppressive strategies would be developed to meet site objectives.

Because of epidemic populations of spruce beetle found on the Wasatch Plateau, many susceptible spruce-fir sites have or soon will be infested with spruce beetle populations. Obviously, the populations could collapse due to natural factors, but at this time the populations remain viable and continue to spread.

Previous silvicultural treatments to mitigate spruce beetle affects have not been effective. What we have learned from previous treatments indicates that treating small landscapes of susceptible host type surrounded by hundreds of acres of untreated susceptible hosts, will not noticeably reduce spruce beetle caused mortality (Rainbow Meadows EA, Bunker Creek Drainage, - Dixie National Forest, Timber Canyon EA - Manti-LaSal National Forest). Particularly in sites where epidemic populations of the insect exist. We also know that thinning guidelines using clusters or groups of spruce to meet density targets are also not effective. The beetles prefer the shaded boles on the residual trees and move from one clump to the next regardless of distance between clumps (Rainbow Meadows EA, Dixie National Forest).

Based on thinning practices used on other sites, I would suggest in the South Tent analysis we select a spruce-fir landscape furthest from the current outbreak, that encompasses one or more drainages as a demonstration site for silvicultural thinning. Selected sites will include treating as much of the spruce-fir component as possible, without leaving abundant host type at susceptible densities adjacent to treated areas. Large landscape level treatments may effectively reduce



spruce beetle caused mortality of residual hosts if between tree thinning guidelines are used and edge effects between treated and untreated sites are minimize. The suggested treatments would be used as demonstration sites. We do not know if the proposed treatment will effectively reduce mortality of residual spruce if challenged by outbreak populations of spruce beetle. Permanent plots should be installed in the treated areas to monitor treatment effectiveness.

At this time, the only treatment we know that significantly reduces mortality of residual spruce is to remove all susceptible hosts. This would include all spruce 10 inches in diameter or larger (Schmid & Frye 1977). Because of many resource issues, this approach to mitigate spruce beetle effects would probably not be considered in most situations. The suggested demonstration treatment may retain some or most of the residual overstory spruce by changing the microclimate, dispersing pheromone plumes (chemical communication between beetles) and opening tree boles to sunlight. This practice has worked for mountain pine beetle, another *Dendroctonus* species of bark beetle and it's associated host types (Bartos & Ammon 1989; Bartos & Booth 1994; McCambridge & Stevens 1982; Pitman et al. 1982; Sartwell 1971; Sartwell & Stevens 1975; Schmid & Mata 1992).

If the proposed treatment is effective at reducing spruce mortality, we will maintain an Englemann spruce seed source and begin to develop a vertical and age class structure less susceptible to spruce beetle population increases. If you have any questions regarding these suggestions, please call me at (801) 476-9728 or contact me via the IBM: smunson/r4.

/s/ *Steve Munson*

STEVE MUNSON
Supervisory Entomologist
Forest Health Protection

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